

AIR WAR COLLEGE

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FRIENDLY SKIES OVER AFRICA:
IMPROVING AIR TRAFFIC SYSTEM SAFETY IN AFRICA AND
UNITED STATES AFRICA COMMAND'S ROLE IN
DEVELOPMENT

By

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Biography

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Abstract

Africa would benefit from comprehensive United States Africa Command (USAFRICOM) leadership in international and interagency efforts to improve air traffic safety focused on a single continent-wide system.¹ Wide ranging national interests, priorities, and economic capabilities are visible in systems across the continent. As a result, while air traffic systems in some nations are fully on par with North America and Europe, others are virtually non-existent. Unfortunately, overall safety is only as effective as the weakest national system traversed.

Both international and US government organizations are currently engaged to improve safety and efficiency across the continent, but disjointed efforts have hampered overall effectiveness. Synchronizing Department of Defense (DoD), interagency, and international organization support fall well within USAFRICOM's unique mission responsibility.² By better integrating efforts, USAFRICOM can create a comprehensive air traffic system fostering international transportation, economic growth, and stability benefiting air transportation Africa-wide.

¹ "United States Africa Command," *United States Africa Command Website*, undated (accessed online 3 September 2008), p. 6, available online at <http://www.cpms.osd.mil/USAFRICOM/USAFRICOM.aspx>.

² "United States Africa Command," *United States Africa Command Website*, undated (accessed online 3 September 2008), p. 6, available online at <http://www.cpms.osd.mil/USAFRICOM/USAFRICOM.aspx>.

Chapter 1

Introduction

Effective economic development advances our national security by helping promote responsible sovereignty, not permanent dependency. Weak and impoverished states and ungoverned areas are not only a threat to their people and a burden on regional economies, but are also susceptible to exploitation by terrorists, tyrants, and international criminals. We will work to bolster threatened states, provide relief in times of crisis, and build capacity in developing states to increase their progress.³

- The National Security Strategy of the United States

In May 2007, a Kenya Airways Boeing 737 crashed into a jungle swamp just moments after departure from Douala, Cameroon International Airport.⁴ Information from airport and air traffic system officials sparked a search approximately 100 miles south of the airport for a crash site and any survivors among the 114 aboard. After two days of searching, local villagers advised that despite earlier reports, the wreckage was located just 3.5 miles from the airport, nearly within view of the terminal. There were no survivors. The reporting error and subsequent delay in locating the crash site was due to lack of air traffic controller follow-up when the aircraft failed to contact the control tower after departure. During further investigation, controllers reported that communication disconnects like the Kenya Airways incident are not uncommon.⁵

A reliable air transportation infrastructure is critical to a secure and thriving economy, and Africa as a continent does not have one. With few national exceptions, roadway navigability depends on the weather, broken vehicles clogging the roadways,⁶ and the mood of hijackers

³ National Security Strategy of the United States of America, (Washington DC: US Government Printing Office, March 2006), p. 33.

⁴ "New Agency Aims to Boost Africa's Air Safety," *Associated Press*, 6 June 2007, available online at www.msnbc.msn.com/id/19070704/, p. 1.

⁵ *ibid*, p. 3.

⁶ "African Wars and Trucking," *Fleetwatch*, March 2000, available at [http:// www.fleetwatch.co.za/magazines/march00.htm](http://www.fleetwatch.co.za/magazines/march00.htm).

blocking the roads.⁷ In general, the continent's coastal nations enjoy few good ports, and many other nations are landlocked.⁸ The resulting limitations make reliable air transportation imperative to prosperity.⁹ Unfortunately, most national air traffic systems have not attained the safety and efficiency needed for economic growth and stability.

A comprehensive USAFRICOM led interagency plan is needed to develop a single continent-wide air traffic system.¹⁰ Standing up the command in October 2007, the United States took a new approach in fostering regional stability.¹¹ A major thrust of the organization's mission includes synergizing interagency efforts to include military, informational, diplomatic, and economic instruments of power, promoting conditions for prosperity, democratic ideals, and security.¹² As such, the command can play a decisive role in shaping Africa's air transportation infrastructure.¹³

With limited funding, infrastructure, and security, a regionalized, non-ground based air traffic system under a single agency will best promote African economic growth and stability.¹⁴ Additionally, funding the system through user fees provides resources for construction, maintenance, security and continued system improvement and expansion. Numerous international, regional, and national organizations are actively engaged to improve the air

⁷ Jeffrey Thamsanqua Radebe, "Ports - The Catalytic Impact: Uniting World Economies through Ports and Harbors," a speech to the 23d World Ports Conference of the International Association of Ports and Harbors, January 2002, available at <http://www.dpe.gov.za/home.asp?id=58>.

⁸ Radebe, "Ports - The Catalytic Impact"

⁹ "IATA Announces Four Point Agenda for Africa," *International Transport Association Website*, 5 October 2005, p. 2, available at <http://www.iata.org/pressroom/pr/2005-10-05-03>.

¹⁰ National Security Strategy of the United States, p. 25.

¹¹ Lauren Ploch, *Africa Command: US Strategic Interests and the Role of the U.S. Military in Africa*, (Washington DC, Congressional Research Service, 16 May 2007), p. 1, available online at http://www.law.umaryland.edu/marshall/crsreports/crsdocuments/RL34003_05162007.pdf.

¹² *ibid*, p. 6.

¹³ "Student Topic Number 09AFRICOM008," Air University Research Information Management System (AURIMS) Website, accessed 14 August 2008, available online at <https://www.afresearch.org/skins/RIMS/home.aspx>.

¹⁴ "IATA Announces Four Point Agenda for Africa," p. 3.

transportation infrastructure. Unfortunately, as programs are limited to local or regional approaches, the overall system continues to languish.

A number of governmental and non-governmental organizations are currently working at all levels to improve various portions of national air traffic systems. USAFRICOM's leadership expertise can effectively meld the efforts of improvement programs to achieve holistic results in system development while preserving African self-determination and autonomy.

Chapter 2

Evolution of Africa's Air Traffic System

In Africa, it's not considered particularly unusual to reach a scheduled destination at night and find the airport closed, the runway lights off and air traffic control nonfunctional. We would usually just circle awhile and then head off to an alternate airport.¹⁵

- David Ryerson, former Air Afrique pilot

Africa's air traffic control system reflects the vision many people have of the continent in general: independent, unpredictable, dissonant, marginally operable, and more than just a little dangerous. African air transportation never truly developed on pace with Europe or North America. In many countries, initial airfields were built under European colonialism.¹⁶ With limited air traffic, flight operations held that with few aircraft and "big sky," the chances of two aircraft colliding were relatively slim.¹⁷

In much of Africa, that same "big sky" concept continues as the basic air safety pretext today.¹⁸ In many areas, pilots are responsible to ensure their aircraft remains clear of others by simply "seeing and avoiding" other aircraft.¹⁹ With modern airspeeds and operating conditions, recent studies indicate pilots operating in a "see and avoid" environment only visually observe converging aircraft about 56 percent of the time.²⁰ In short, pilots operating aircraft at speeds of over 600 miles per hour must depend on little more than visual acuity, rapid reaction, and sheer luck to ensure conflict avoidance.

¹⁵ "New Agency Aims to Boost Africa's Air Safety," p.2.

¹⁶ *ibid*, p.3.

¹⁷ David Stout, "Seats Found After Crash of New Jersey-Based Plane," *The New York Times*, 16 September 1997, available at <http://query.nytimes.com/gst/fullpage.html?res=9C0DE1DB1438F935A2575AC0A961958260&n=Top/Reference/Times%20Topics/Subjects/U/United%20States%20Argument%20and%20Defense>.

¹⁸ *Midair Collision Avoidance Pamphlet*, 354th Fighter Wing, Eielson AFB, AL, 12 March 2007, p. 2, available at <http://www.elmendorf.af.mil/shared/media/document/AFD-080130-075.pdf>.

¹⁹ Australian Transport Safety Bureau, *Limitations of the See and Avoid Principle*, (Civic Square ACT, Australian Transport Safety Bureau, 2004), p. 3.

²⁰ *ibid*, p. 3.

Following World War II, air transportation grew rapidly in North America and Europe, with a view toward expansion to neighboring parts of the world, including Africa.²¹ However, prospective aviation enterprises found that many locations lacked the basic infrastructure needed to maintain a safe, profitable air transportation schedule.²² While individual nations, including many newly independent former colonies, struggled to develop air traffic systems with limited resources, investors moved to more immediately profitable areas of the world.²³

Compounding the problem, in the 1960s some departing colonial powers, like Britain and France, helped establish aviation authorities in newly forming governments. Unfortunately, after pouring relatively little into aviation infrastructure during colonial rule, others left without providing any long-term sustainment plans.²⁴ As a result, virtually every one of 54 separate African entities administers air transportation taxes, collects fees,²⁵ and maintains infrastructure as they see fit.²⁶ While each nation claims to maintain International Civil Aviation Organization (ICAO) standards, not all have successfully achieved the required safety levels.²⁷ The lack of qualified personnel and little or no government oversight resulted in lax safety standards in both air traffic control and aircraft airworthiness.²⁸

To date, no comprehensive continental air traffic system plan exists, and overall infrastructure capability varies significantly. One of Africa's largest markets includes South

²¹ T. Wilson, "Training and Operations of Air Traffic Control Services," *Aircraft Engineering and Aerospace Technology*, 1971, pp. 10-12.

²² Osi S. Akpoghomeh, "The Development of Air Transportation in Nigeria," *Science Direct - Journal of Transport Geography*, 16 September 1999, available online at http://www.sciencedirect.com/science?_ob=ArticleURL&_udi=B6VG8-3XDSKPF-4&_user=10&_rdoc=1&_fmt=&_orig=search&_sort=d&view=c&_acct=C000050221&_version=1&_urlVersion=0&_userid=10&md5=579f43e6741b3ebaf00c4e03e6940a90.

²³ *ibid.*

²⁴ "How to Reduce Air Traffic Disasters in Africa," *Africa News*, 11 July 2008, available at <http://www.afriquenligne.fr/news/africa-news/how-to-reduce-air-traffic-disasters-in-africa-200807118742.html>.

²⁵ "IATA Announces Four Point Agenda for Africa," p. 3.

²⁶ "Improving African Air Safety," *Air Safety Week*, 28 April 2008, available online at <http://www.aviationtoday.com/asw/categories/commercial/21422.html>.

²⁷ "IATA Announces Four Point Agenda for Africa," p. 4.

²⁸ Bert Essenbert, "The Future of Civil Aviation in Africa: Restructuring and Social Dialogue," Working Papers Submitted to the International Labor Office, Geneva, 2005, pp. 27-30, available online at <http://www-ilo-mirror.cornell.edu/public/english/dialogue/sector/papers/transport/wp231.pdf>.

Africa, with Johannesburg alone making up 3.4 percent of the total aviation market.²⁹ Other major markets include Morocco, Tunisia, Algeria, and Egypt.³⁰ Internationally, the predominance of traffic comes to Africa from Europe and North America.³¹ At the upper end of air traffic safety and efficiency, South Africa maintains a system on par with those of Europe and North America.³² At the opposite end of the spectrum, the African Airlines Association listed the Democratic Republic of the Congo (DRC) as the most significant violator of air traffic rules on the continent, noting 55 percent of all accidents on the continent occurred in the DRC.³³ The report stated, “DRC is the only country on the continent, where there are no visible attempts to seriously tackle the continual high rates of accidents.”³⁴

Historically, Africa’s aviation safety record reflects a lack of continuity in infrastructure, training, and security. From 1990 to 1999, ICAO reported an aircraft loss rate for Africa of 10.84 aircraft per one million flights.³⁵ While the rate may not initially sound significant, one must consider the rate doesn’t account for all aircraft accidents, just accidents in which aircraft were destroyed.³⁶ Furthermore, the rate was significantly higher than the North America and Europe combined total of 2.69 for the same period.³⁷ In 2003, Africa represented 25 percent of the total number of fatal accidents reported worldwide with just 4.5 percent of the world’s total passenger traffic.³⁸ More recently, in a June 2006 announcement, the International Aviation Transportation Association (IATA) placed Africa’s poor safety record in perspective, stating

²⁹ Herman Groenewald, “AIS in Africa - The South African Perspective,” a briefing provided to the Global Aeronautical Information System Congress & Exhibition, 27-29 June 2006, p. 9, available at http://www.eurocontrol.int:80/aim/gallery/content/public/pps/congress/3-1groenewald_southafrica.pps.

³⁰ Daniel Calleia, “African Air Safety Analysis & Action Plan,” a briefing provided to the ICAO High Level AFI Conference, (Montreal, Canada, 17 September 2007), p. 8.

³¹ *ibid*, p. 9.

³² Groenewald, “AIS in Africa - The South African Perspective,” p. 12.

³³ *ibid*, p. 1.

³⁴ *ibid*, p. 1.

³⁵ “IATA Announces Four Point Agenda for Africa,” p. 1.

³⁶ “2005 Aviation & Allied Africa Journal Editorial Calendar,” *Aviation Business Journal*, p.1, available online at <http://www.aviationbusinessjournal.aero/2005calendar.pdf>.

³⁷ *ibid*, p. 2.

³⁸ *ibid*, p. 1.

that, “a passenger is 30 times more likely to die in the crash of an African air carrier as they would be on a United States carrier.”³⁹ Consequently, air transportation costs, particularly insurance, are some of the highest in the world.⁴⁰

African nations face numerous challenges in formulating and maintaining a safe, efficient air traffic system. The IATA cited two specific trends leading to less than adequate safety.⁴¹ First, governments are not making strategic investments to support the industry and reap its economic benefits. While some simply do not gain sufficient income to adequately reinvest, others redirect profits to other priorities, including pocketing of funds by unscrupulous officials.⁴² Other major problems are enforcement weakness and corruption within national civil aviation authorities.⁴³ For example, until recently in Liberia, authorities outside the civil aviation agency had authority to license and certify aircraft and air transportation.⁴⁴ Government involvement and accountability play a significant role in the effectiveness of national air traffic systems.

Economic issues also impact system development. Infrastructure costs limit the number and size of suitable airports for use in commercial air transportation ventures.⁴⁵ Factors driving high costs include few private enterprises to develop infrastructure and limited capability to develop required resources.⁴⁶ Coupled with high costs are the relatively limited resources available through governments to finance air transportation systems.

³⁹ Nicola Clark, “4 African Countries Singled Out For Unsafe Skies,” *The International Herald Tribune*, 6 June 2006, available online at <http://www.ihf.com/articles/2006/06/05/news/air.php>.

⁴⁰ “How to Reduce Air Traffic Disasters in Africa,” p.4.

⁴¹ *ibid*, p. 4.

⁴² Don Phillips, “A Champion of Air Safety in Africa Who Wouldn’t be Cowed,” *International Herald Tribune*, 2 August 2007, available at <http://www.ihf.com/articles/2007/08/02/news/gambia.php>.

⁴³ “African Airspace Unsafe, Says ICAO Scribe,” *Fly South Aviation News Network*, 31 August 2007, available at <http://www.flysouth.co.za/news/2007-08-31/African%20Airspace%20Unsafe,%20Says%20ICAO%20Scribe.shtml>.

⁴⁴ “Report of the Panel of Experts Appointed Pursuant to Security Council Resolution 1306 (2000), Paragraph 19, in Relation to Sierra Leone,” *Global Security.Org Website*, December 2006, p. 7, available at <http://www.globalsecurity.org/military/library/report/2000/s-2000-1195.htm>.

⁴⁵ Program Highlights, United States European Command, United States Air Forces Europe, and African Center For Strategic Studies African Air Chiefs Conference, 23-24 May 2007, p. 14.

⁴⁶ “Overview of the State of Air Transport in Africa,” Meeting of African Air Ministers Responsible for Air Transport (African Union, 16-19 May 2005): p. 8.

Along with economics, politics play into air traffic system effectiveness. Some nations refuse to share aeronautical and air traffic information with other countries based on national aggrandizement, fear of losing information control with the introduction of new technology, and basic human prejudice (racial, religious, and tribal).⁴⁷ Finally, and most tragically, violence and political unrest impact development and sustainment. In Cote d' Ivoire (Ivory Coast), military coups and a two-year civil war directly impacted reliability.⁴⁸ From 2002 through 2004, major airports and associated air traffic control facilities were overrun during fighting and returned to government control only after French intervention to restore order.⁴⁹

Regional historical affiliations also hinder synchronous air traffic system development in Africa. On the continental borders, nations enter into more lucrative cooperative agreements with European or Arab neighbors.⁵⁰ Others maintain affiliation with former colonial powers.⁵¹ Although these agreements benefit individual nations, they do little to promote comprehensive safety and efficiency for the continent as a whole.

Similar to regionalization, government ownership of airlines hinders free access to airspace in a number of nations across the continent. To provide a competitive advantage to nationally-owned airlines, government aviation authorities reserve preferred airspace altitudes, arrival and departure times, and priority to their government-owned airlines.⁵² The rules result in a patchwork of altitudes and routes for aircraft planning international flights. While assisting

⁴⁷ Titlayo Owolaby-Akerlee, "Human Factors in Evolution of AIS to AIM," a presentation to the Eurocontrol Global AIS Conference, (Brussels, Belgium, 26-28 June 2007): p. 2, available at http://www.eurocontrol.int/aim/gallery/content/public/pdf/global_aim_strategy.pdf.

⁴⁸ John Barham, "African Airport Aims for TSA Clearance," *Security Management*, 12 November 2007, available at <http://www.asisonline.org>.

⁴⁹ *ibid.*

⁵⁰ Owolaby-Akerlee, "Human Factors in Evolution of AIS to AIM," p. 2.

⁵¹ "Overview of the State of Air Transport in Africa," pp. 4-6.

⁵² "Economic Integration in Africa: Experience in Air Transport Liberalisation: The Yamoussoukro Decision," (briefing to the European Union-African Union Aviation Seminar, 13-14 September 2006): p. 5, available at http://ec.europa.eu/transport/air_portal/international/pillars/global_partners/doc/2006_09_13_eu_au_seminar/eu_au_at_continental_integration_en.pdf.

national airlines within the confines of their own nation, the lack of airspace liberalization hampers air traffic efficiency Africa-wide.

Many of the shortcomings of Africa's air traffic system were highlighted in the investigation of a 1997 mid-air mishap between a US Air Force C-141 and a German Air Force Tu-54 aircraft off the coast of Namibia.⁵³ Both aircraft departed African airports and were entering the international en route structure, with the German aircraft bound for Cape Town, South Africa and the US aircraft bound for Ascension Island.⁵⁴ The aircraft collided at high altitude with virtually no indication of convergence by either aircrew.⁵⁵ Ultimately, pilot error was listed as the primary cause of the accident, but a number of air traffic related issues may have prevented the disaster.⁵⁶ Both aircraft filed ICAO flight plans with appropriate altitudes to be flown based on their routing.⁵⁷ Both pilots also provided air traffic controllers with their position, but as air traffic control in the area of flight was advisory only, controllers failed to inform the aircraft of one another's position.⁵⁸ Although not required, alert traffic advisories may have prevented the disaster.

During follow-on review and investigation, USAF investigators noted the lack of reliable landline communications between air traffic control facilities hampered the ability to pass aircraft clearance and movement information.⁵⁹ For example, communications between Windhoek, Namibia and Luanda, Angola air traffic control facilities were via High Frequency

⁵³ Karen U. Kwiatkowski, *Expeditionary Air Operations in Africa: Challenges and Solutions*, (Air University Press, Maxwell Air Force Base, AL, December 2001): p. 9.

⁵⁴ David A. Fulghum and John D. Morrocco, "German, U.S. Aircraft Crash Off African Coast, *New Standard*, 16 September 1997, available online at http://www.c141heaven.com/65/pic_65_9405.html

⁵⁵ "Search Ship Finds Plane Wreckage in South Atlantic," *Cable News Network*, 15 September 1997, p. 6, available online at http://www.c141heaven.com/65/pic_65_9405.html.

⁵⁶ Mr. Larry Schomaker (Headquarters Air Mobility Command, Directorate of Operations, investigator of the mid-air collision between a USAF C-141 and German Tu-24 aircraft near Luanda Namibia 13 September 1997), interview by the author 7 November 2008.

⁵⁷ *ibid.*

⁵⁸ *ibid.*

⁵⁹ Mr. Schomaker, interview 7 November 2008.

radio, with limited communications and poor reliability.⁶⁰ When questioned concerning the communications capability, officials advised that landlines between the facilities were frequently torn down by thieves. Investigators also noted that while nations claimed to follow ICAO rules and procedures, some followed only the rules they felt appropriate, implementing them as they saw fit.⁶¹

To provide some degree of safety and control, aircraft overflying Africa take responsibility upon themselves for separation and coordination of aircraft routing.⁶² Many aircraft, including military and state owned, privately owned, and commercial, monitor a common frequency, providing position and altitude reports. Aircraft thus track one another's positions and movement, providing some degree of safety and separation. Notably, aircraft do not rely on air traffic control facilities for reliable information.

Economic, political, and regional affiliations all play a role in the challenges faced in developing a safe, efficient air traffic system across Africa. But despite the challenges, the continent's air transportation industry continues to grow. The growth highlights the potential for greater economic benefit and stability through a safe and efficient air transportation system.

⁶⁰ Mr. Schomaker, interview 7 November 2008.

⁶¹ *ibid.*

⁶² *ibid.*

Chapter 3

Air Transportation Potential For Growth and Stability

Helping Africa is also in our self-interest. It's simply not a healthy or safe world when so many people in an important region are allowed to fall behind. And it's certainly not a world we want our children to inherit.⁶³

- Paul Wolfowitz, Former World Bank President

Air transportation growth in Africa, despite significant challenges, highlights the industry's economic potential. During the years 2001 to 2003, international aviation passenger traffic grew 3.3 percent in Africa while the rest of the world grew by only 0.5 percent.⁶⁴ The continent's substantial market growth during the period is remarkable, occurring despite what IATA Director Giovanni Bisignani called "The four horsemen of the Apocalypse," including war on terrorism, a weak economy, international insecurity, and Severe Acute Respiratory Syndrome or SARS. Since 2003, air transportation increased 5.3 to 5.7 percent annually and is projected to continue.⁶⁵ In fact, with continuing rapid growth in the continent's oil industry, while total international traffic worldwide picked up at a 6 percent rate in May 2008, Africa's increased by 15 percent, second only to the Middle East.⁶⁶ The growth described could be even greater with a more efficient and effective air transportation system.

Along with contributing to economic stability, development of a comprehensive air traffic system serves as a key element in fighting terrorism and smuggling on the continent.⁶⁷ In one case through 2005, lax licensing and enforcement laws enabled former Liberian President

⁶³ Paul Wolfowitz, (Eisenstadt Memorial Lecture, Atlanta, GA, 10 December 2006), available online at <http://web.worldbank.org/WBSITE/EXTERNAL/EXTABOUTUS/ORGANIZATION/EXTPRESIDENT2007/EXTPASTPRESIDENTS/EXTOFFICEPRESIDENT/0,,contentMDK:21156869~menuPK:51175739~pagePK:51174171~piPK:64258873~theSitePK:1014541,00.html>.

⁶⁴ Giovanni Bisignani, "Leading Change," (lecture to the International Aviation Club, Washington, DC, 20 April 2004), available online at <http://www.iacwashington.org/speeches/bisignani042004.pdf>.

⁶⁵ Groenwald, p. 10.

⁶⁶ "Moderate Traffic Growth in May 2008," *Airport Councils International*, 1 July 2008, available at http://www.airports.org/cda/aci_common/display/main/aci_content07_c.jsp?zn=aci&cp=1-7-46^23695_666_2__

⁶⁷ "Report of the Panel of Experts Appointed Pursuant to Security Council Resolution 1306 (2000), Paragraph 19, in Relation to Sierra Leone," p. 8.

Charles Taylor to reputedly oversee weapons transportation to Sierra Leone in exchange for diamonds transported by air.⁶⁸ With virtually non-existent radar air surveillance capability in most of West Africa, detecting the movement of unauthorized or unreported aircraft is nearly impossible. As a result, arms traffickers, drug smugglers, and human traffickers continue to operate with impunity. The United Nations Security Council committee reviewing the situation recommended installation of primary or pseudo radar systems at major West African airports. The intent is to provide better means to track all aircraft, particularly those carrying illegal cargo.⁶⁹

An improved air traffic structure in Africa improves United States security as well. With a continuing anti-terrorism mission on the continent and humanitarian airlift and security support, the US Air Force is a significant user of the air traffic system throughout Africa. In the 9 months from 1 January 2008 through 30 September 2008 alone, the Air Force (including Civil Reserve Air Fleet, organic airlift, and tanker missions using African airfields) flew 867 missions from 50 different airports in 30 African nations.⁷⁰ USAFRICOM will also assume responsibility for the continuing Horn of Africa anti-terrorism mission operating from Djibouti.⁷¹ This vital mission will continue well into the foreseeable future, making the Air Force an ongoing significant aviation user in Africa.

Beyond addressing terrorism and smuggling, system improvement provides a first step for many nations toward stable and responsive governance. Stephen Ellis, senior researcher at the Afrika-Studiecentrum at Leiden University, the Netherlands, asserts that improvement may

⁶⁸ *ibid.*, p. 10.

⁶⁹ "Report of Panel Appointed Pursuant to Security Council Resolution in Relation to Sierra Leone," p. 9.

⁷⁰ United States Air Force Global Decision Support System II database, 30 September 2008.

⁷¹ Robert E. Gribbin, "Implementing AFRICOM," *American Diplomacy*, (UNC Press, Chapel Hill, NC, 12 February 2008), available at http://www.unc.edu/depts/diplomat/item/2008/0103/grib/gribbin_africom.html.

periodically require overriding individual national sovereignty.⁷² While some African states are effective and productive, many have not shown the capability to develop working administrations. A continent wide air traffic system, administered by a single organization, provides two key benefits. First, the organization establishes an effective overarching air traffic system, providing long-term stability in each nation's sovereign airspace. Second, and equally important, working with international aviation authorities to manage the program would provide national government officials practical experience to apply in other areas of government.

With increasing air traffic volume and the potential for improved air safety and monitoring, assistance in developing a more efficient and effective air traffic system in Africa offers substantial benefits in shaping operations. In fact, a number of national and international entities are already working through various programs toward improvement.

⁷² Stephen Ellis, "How to Rebuild Africa," *Foreign Affairs*, Sep/Oct 2005, pp. 135-148, available online at <http://web.ebscohost.com/ehost/detail?vid=1&hid=12&sid=f16a89c3-b224-4185-aa57-07d>.

Chapter 4

Current Improvement Efforts

America is on a mission of mercy. We're treating African leaders as equal partners. We expect them to produce measurable results. We expect them to fight corruption, and invest in the health and education of their people, and pursue market-based economic policies. This mission serves our security interests -- people who live in chaos and despair are more likely to fall under the sway of violent ideologies. This mission serves our moral interests -- we're all children of God, and having the power to save lives comes with the obligation to use it.⁷³

- President George W. Bush

Increasing air traffic system effectiveness in Africa offers substantial benefits, but the challenge is how to achieve the level of safety and efficiency needed. Despite the continent's "Wild West" aviation image, national and international governmental and non-governmental organizations are striving to improve various portions of African aviation.

At the international level, in 2005 the IATA launched a 3 million dollar program to revitalize Africa's aviation industry.⁷⁴ The four major elements of the program include enhanced safety efforts among airlines and air traffic control, improved infrastructure development, liberalization of competition among airlines, and simplification of business practices.⁷⁵ Program effectiveness hinges on national aviation agencies adopting safety audits for all of their air transportation practices.⁷⁶ Although through April 2008 only 20 of 94 registered African airlines had requested IATA safety audits, the organization's efforts provide a major step by African air transportation toward international safety standard compliance.⁷⁷

⁷³ George W. Bush, (remarks to Leon H. Sullivan Foundation, Washington, DC, 26 February 2008), available online at <http://www.whitehouse.gov/news/releases/2008/02/20080226.html>.

⁷⁴ *ibid.*, p. 3.

⁷⁵ *ibid.*, pp. 3-4.

⁷⁶ Giovanni Bisignani, "Agenda for Africa, Johannesburg," (address to Industry Partners and Stakeholders, Gallagher Estate, Johannesburg, South Africa, 5 October 2005): p. 3, available at <http://www1.iata.org/pressroom/speeches/2005-10-05-02>.

⁷⁷ Pascal Fletcher, "Interview - IATA Calls For Safer, More Open African Skies," *Reuters UK Website*, 10 April 2008, available online at <http://uk.reuters.com/article/latestCrisis/idUKL1041757620080410>

In addition to international efforts, several regional approaches to managing portions of air traffic systems are meeting with varying degrees of success. Two regional organizations include the African Civil Aviation Authority (AFRO-CAA) and the Agency for the Safety of Aerial Navigation in Africa and Madagascar (ASECNA). The AFRO-CAA was developed in 2006 to help stem the tide of aviation accidents in Africa.⁷⁸ With approximately 125 staff members at five regional offices including Ethiopia, Cameroon, Libya, Nigeria, and South Africa, the organization's main task is to develop uniform safety standards. In addition to creating regional standards, AFRO-CAA initiated work with both ICAO and the FAA in training and safety standards development.

ASECNA was founded in 1959 to provide West African airspace and meteorology oversight. The organization recently launched a cooperative agreement with the IATA to establish standardized levels of safety in Western Africa.⁷⁹ Although ASECNA operated successfully for years, the organization recently came under scrutiny for poor air traffic and air transportation safety records in West Africa. For example, air traffic controllers under ASECNA recently threatened to strike due to low pay as well as poor technical and language training.⁸⁰ Additionally, Madagascar withdrew from ASECNA membership, and Senegal reassumed management of its national airports while remaining an ASECNA member.⁸¹

While many improvement programs focus regionally, other countries have implemented air traffic improvement programs within their individual nations. In Rwanda, government officials adopted a proactive approach to regional air traffic control by constructing a 40 meter antenna on

⁷⁸ "New Agency Aims to Boost Africa's Air Safety."

⁷⁹ "Improving African Air Safety."

⁸⁰ Tatiana Iavorskia, "Air Traffic Control Warnings about ASECNA Airspace," *ATC Network*, 16 July 2008, available at <http://www.ifatca.org/press/150708.pdf>.

⁸¹ "Senegal Takes Back Running of its Airports," *Mail and Guardian Online*, 3 May 2008, available at www.mg.co.za/article/2008-05-03-senegal-takes-back-running-of-its-airports.

a 4,507 meter peak of the Karisimbi Mountains.⁸² The intent is to offer radar services across some of the currently unmonitored central portions of Africa for a fee, with a potential intake projected as high as 156 million dollars annually. Similarly, in late 2006, Tanzania purchased a 40 million dollar radar system from a Great Britain corporation to improve air traffic service coverage.⁸³ The purchase sparked controversy considering the cost of the system was nearly half of the entire Tanzanian debt for the year. Additionally, the system was specifically designed for military use in national defense. For a nation with no significant natural airborne enemies, questions concerning governmental ethical accountability abound, particularly when a system suitable for civilian use could be purchased for about one-quarter of the cost.

In addition to national and regional organizations focused on improving safety and efficiency, South Africa contracted its air traffic operations to a private organization.⁸⁴ South African airspace is managed by Air Traffic and Navigation Services (ATNS) Corporation. ATNS provides comprehensive air traffic management while eliminating government overhead costs including operator and maintainer training, infrastructure and facilities installation and maintenance, and administrative oversight. To ensure continued growth and profitability, the contractor plans and develops system modernization and upgrades, including a current project to implement a single sky concept for en route control, equal to rules and procedures under implementation in Europe and North America. The contractor assumes responsibility to ensure the “end product” meets international standards. Despite some challenges in establishing and overseeing quality assurance processes, ATNS and South Africa serve as a bright spot in African air traffic system effectiveness.

⁸² “Communications and Transport,” *Africa Research Bulletin*, (Blackwell Publishing Ltd, July-August, 2007), available at <http://www.interscience.wiley.com/journal/118481872/issue>.

⁸³ Alan Hudson, “Arms to Africa? Policy Coherence for Development and Power,” *Overseas Development Institute Website*, 31 January 2007, available at http://blogs.odi.org.uk/blogs/main/archive/2007/01/31/Arms_exports.aspx.

⁸⁴ Groenewald, “AIS in Africa - The South African Perspective.”

A number of US government organizations are committed to improving air safety in Africa as well. The FAA offered free training for air operations officers and aircraft accident investigators through AFRO-CAA.⁸⁵ Additionally, in association with the World Bank, the FAA inaugurated a program called Safe Skies for Africa.⁸⁶ In an effort to help modernize Africa's air traffic system infrastructure, the FAA visited Kenya, Tanzania, and Uganda thus far to evaluate potential implementation of new automated radar systems. Nations selected for radar installation will receive assistance in financing and installing the 29 million dollar systems.

As noted, numerous organizations are actively involved in improving air traffic system safety in a variety of African nations with the best of intentions and often with tangible results. However, it appears that many of these efforts lack overall coordination and oversight. Consequently, while some nations are improving aviation safety and security, others fall further behind, ultimately leading to little overall continent-wide improvement.

⁸⁵ New Agency Aims to Boost Africa's Air Safety," p. 3.

⁸⁶ Don Phillips, "African Countries Risk Losing Millions in Aid over Poor Air Safety," *International Herald Tribune*, 4 June 2006, p. 1, available at <http://www.ihf.com/articles/2006/06/04/news/africa.php>.

Chapter 5

Conclusions

In our diversity as African states, we need to compromise on our individual interest if we are to achieve the larger goals of the continent within the world.⁸⁷

- Mr. Joe Baidoo-Ansah, Ghana Minister of Trade, Industry, and Private Sector Development

Development of a comprehensive air traffic system in Africa does not lack participants or effort. Both public and private organizations at every level are actively working toward system improvement. Unfortunately, international, regional, and national efforts have achieved overall marginal results. While reducing its 10-year accident rate numerically, Africa continues to lead the world in fatal aircraft accidents. Africa's rate of 9.79 aircraft losses per one million flights from 2005 to 2008⁸⁸ was 7 times higher than the North America/Europe combined rate of 1.30;⁸⁹ an even greater ratio disparity than in the 1990's. Interestingly, nearly half of the accidents in Africa occurred during landing, with studies indicating that a timely go-around call initiated by air traffic control could have prevented a number of accidents.⁹⁰

Why has African flight safety failed to improve in comparison to the rest of the world despite extensive involvement and assistance? One key reason is a lack of synchronization between the myriad programs by various organizations. Air traffic system improvement efforts by international organizations, individual nations, non-governmental organizations, and even contractors are piecemeal, focusing on single nations or a single region. Aviation's inherent capability to transcend national boundaries hinders the overall effectiveness of localized approaches to improvement. As few flights are contained within the confines of a single nation,

⁸⁷ "Africa's Airports Industry Meets," *Daily Guide*, 4 August 2008, available online at <http://www.modernghana.com/news/176955/1/africas-airports-industry-meets.html>.

⁸⁸ "IATA Announces Four Point Agenda for Africa," pp. 1, 4.

⁸⁹ *ibid*, p. 2.

⁹⁰ *ibid*, Para 7.

overall effectiveness is tied to “the weakest link” in the international air traffic system. For improvement efforts to be successful, the system must be improved as a whole, rather than 54 individual parts.

At the systems level, many nations possess neither adequate resources nor expertise to develop, secure, and maintain a robust air traffic infrastructure.⁹¹ Existing facilities are often out of service or not operating properly due to inadequate maintenance, lack of parts, or both.⁹² Additionally, reliable commercial and back-up electrical power, essential to equipment reliability and accuracy is not available in many countries.⁹³ Along with equipment, adequate ground transportation to provide maintenance access to facilities is not available. More importantly, facilities must be secured, not just from possible terrorist acts, but more commonly from simple theft. In 1992 and 1993, during Operation RESTORE HOPE, one of the most significant issues faced in air traffic control communications operability at an Egyptian airport was simply keeping copper wire communications lines from being stolen.⁹⁴ Basic air traffic navigation and communications systems and supporting infrastructure reliability offer a significant challenge throughout Africa.

Insufficient infrastructure and poor equipment reliability highlight a second critical requirement -- the need for knowledgeable and reliable oversight of facilities, systems, communications, and safety programs.⁹⁵ Airspace sovereignty is a national government right, but with that right comes a responsibility to provide oversight and safety enforcement. While most nations in Africa take the responsibility seriously, some nations use the air traffic system

⁹¹ “Improving African Air Safety.”

⁹² “Overview of the State of Air Transport in Africa,” Meeting of African Air Ministers Responsible for Air Transport (African Union), 16-19 May 2005, p. 8.

⁹³ *ibid*, p. 11.

⁹⁴ Lt Col Dave Schroeder, noted from personal experience during deployment to Cairo West Air Base, Egypt in support of Operations RESTORE HOPE, December 1992-March 1993.

⁹⁵ Overview of the State of Air Transport in Africa,” p. 8.

solely as a source for personal or non-transportation revenue.⁹⁶ System standardization and continuity is integral in a comprehensive air traffic system, and oversight is a major part of the standardization process.

Similarly, personnel training is critical in developing an effective air traffic system.⁹⁷ Most African facilities are understaffed in certified controllers.⁹⁸ The Namibian Air Traffic Controllers Association, for example, recently announced that failure to address the working conditions of the country's controllers and to upgrade navigation systems could soon jeopardize Namibia's air safety. While several nations, including South Africa and Nigeria offer ICAO-approved air traffic control training programs, overall training capacity in Africa provides only about 30 percent of the required number of controllers needed to sustain air operations on the continent.⁹⁹ As a result, many nations must send personnel to schools in the United States and Europe to receive training.¹⁰⁰ Unfortunately, once these controllers return home and attain certification, they often relocate to Europe or the Middle East for greater pay and benefits.

International, regional, and national level efforts highlight the resources currently focused on improvement. However, as noted, overarching leadership is required to provide system wide gains in safety and efficiency. AFRICOM's focus on forging interagency partnerships to promote African growth and stability make it an exemplary organization to provide comprehensive leadership of the air traffic system improvement effort.

⁹⁶ "Improving African Air Safety."

⁹⁷ *ibid.* p. 4.

⁹⁸ "Overview of the State of Air Transport in Africa," p. 6.

⁹⁹ Essenbert, p. 28.

¹⁰⁰ New Agency Aims to Boost Africa's Air Safety," p. 3.

Chapter 6

Recommendations

The establishment of USAFRICOM presents a tremendous opportunity to work closely with U.S. interagency partners. Working together as a team, the net result over time will be a more stable and more prosperous Africa with expanded horizons for growth and development.¹⁰¹

- General William “Kip” Ward
Commander, United States Africa Command

Stability is an essential part of any rebuilding effort in Africa. However, traditional “peacekeeping” is not the single answer, nor is it enough. Rather than additional funding or another improvement project, USAFRICOM needs to lead an overarching plan for development of a comprehensive Africa-wide air traffic system. The effort requires both international and interagency coordination working hand-in-hand with US government partners to establish a comprehensive approach to system improvement.

Continental Air Traffic System Concept

To overcome the significant disparity in air traffic safety and service quality across the continent, Africa would benefit from a minimally ground-based, continental air traffic system under single organization oversight. Current technologies and organizational structures are available to implement a system providing safety, efficiency and continuity with minimal infrastructure cost. Development of a continent-wide air traffic system requires focus on several primary areas including system management, air traffic automation systems, communications and navigation system development, and construction of en route air traffic control facilities.

Air traffic system automation capability is growing throughout Africa, although the entire

¹⁰¹ General William “Kip” Ward, as quoted in House, *Statement of General William “Kip” Ward, Commander, United States Africa Command Before the House Armed Services Committee*, 109th Congress, 14 November 2007, p. 1.

continent is not fully automated.¹⁰² Automation systems link radar with critical aircraft movement information including call signs, clearances, destination airports, routing, etc. Automation allows control facilities to pass information from one to the next without requiring facilities to manually contact the next air traffic facility in the aircraft's route and verbally pass information.¹⁰³ A continental air traffic facility requires full continent-wide automation as soon as practicable, particularly between en route air traffic facilities.

To provide aircraft movement tracking and surveillance, new technology enables the development of en route air traffic systems with minimum ground-based navigation and communication systems. For example, the advent of Automatic Dependent Surveillance Broadcast, or ADS-B, requires minimal ground systems while providing accurate aircraft position data.¹⁰⁴ The system gathers aircraft reported Global Positioning System location information with appropriate altitude and airspeed using equipment on board each aircraft. Widely scattered ground receiving systems then relay the information to air traffic controllers. The information is provided to other similarly equipped airborne aircraft as well. Air traffic management at altitudes below 18,000 feet will still require terminal radar systems. However, the funding gained via user fees will assist in development of improved terminal arrival and departure air traffic system equipment.

Operation of ADS-B equipment will require navigation system upgrades on aircraft to enable communication with system ground equipment.¹⁰⁵ The required avionics systems could be funded via loans or grants managed through the IATA or one of Africa's regional aviation

¹⁰² Patrick LeFevre, "Air Traffic Management in Africa," a briefing provided via Thales International, Accra, Ghana, 2 December 2005, pp. 5-6, available online at <http://www.thalesgroup.com>.

¹⁰³ A. S. Debeleck, J. D. Dehn, L. L. Muchinsky, and D. M. Smith, "Next Generation Air Traffic Control Automation," *IBM Systems Journal*, Vol. 34, No. 1, 1995, p. 1, available online at <http://www.research.ibm.com/journal/sj/341/debelack.pdf>.

¹⁰⁴ "ADS-B Creates a New Standard of Aviation Safety," Garmin website, available at <http://www.garmin.com>.

¹⁰⁵ Debeleck and Dehn, p. 1.

organizations. While an overall significant expense, the cost of maintaining and securing equipment on board aircraft will likely be significantly less than securing and maintaining remote ground-based navigation systems.

To provide air-to-ground communications, the use of Very Small Aperture Satellite Terminals, or V-SAT, enables continental-wide communications with a minimum of ground terminals.¹⁰⁶ By maximizing the use of non-ground based navigational aids and consolidating facilities, the en route air traffic control structure could be managed by as few as three regional facilities located throughout Africa. Although the regional facilities could be located virtually anywhere in Africa, based on location and currently existing facilities, a scenario may include sites in South Africa to manage the southern portion of the continent, a facility in Kenya and/or Senegal to manage the Sub-Saharan central portion, and finally, a North Africa facility in Egypt or Tunisia.

As with any major developmental program, initial funding is a major consideration and concern. Initial development of a continent-wide air traffic system requires financing, most likely via the World Bank or International Monetary Fund.¹⁰⁷ Support for the program from the United States through the FAA and DoD via USAFRICOM is required to garner the necessary support for initial financing. However, the initial financing may be of significant benefit in program success. Connecting the project and its success through international financial institutions brings financial oversight and expertise to the project.

Effective air traffic system development requires the comprehensive planning and oversight afforded by a single oversight agency. As air traffic evolved in Europe in the late 1950's and

¹⁰⁶ Air Traffic and Navigation Services Company, "Use of VSAT Networks," a report to the Twelfth Meeting on the Improvement of the Air Traffic Services in the South Atlantic (SAT/12): First Meeting of the ATM Working Group (ATM/WG), CNS Working Group (CNS/WG) and Study Group on New Airspace Structure (IAS/SG), International Civil Aviation Organization, Rio de Janeiro, Brazil, 5-9 September 2005, <http://www.lima.icao.int/MeetProg/2005/SAT12TF01WGS/SAT12TF1WP03.pdf>.

¹⁰⁷ "Aviation: Taking U.S. Solutions Worldwide," *Volpe Center Highlights*.

early 1960's, nations faced similar safety standardization issues seen in Africa today. As a result, countries formed the European Organization for the Safety of Air Navigation, or EUROCONTROL, in 1963.¹⁰⁸ With 38 member nations, EUROCONTROL is charged with planning and managing key air traffic system functions including air navigation services, strategic and tactical flow control (scheduling), air traffic controller training, regional airspace management, technology development, and air navigation fee collection.¹⁰⁹ A similar oversight organization in Africa, with planning and oversight in conjunction with national authorities of each member nation, would ensure a single standard of safety and certification.

Several organizations have shown the capability to manage such a system on a regional level, and may be expanded continent wide. For example, the South African Development Community, through the South African Air Traffic and Navigation Services Corporation indicated plans to adopt a regional approach to air traffic management, particularly under the seamless or single sky concept.¹¹⁰ The concept utilizes aircraft navigational aid equipment and satellite based navigation to reduce the level of coordination needed with ground communications. Expanding the concept to a continental level provides seamless, cost effective implementation.

Single organizational management of the air traffic system also enables a single collection point for air navigation fees.¹¹¹ A percentage of the fees collected would be maintained by the oversight organization to re-invest in the air traffic system. Additional monies could then be

¹⁰⁸ "EUROCONTROL History: 40 Years of Service to European Aviation," EUROCONTROL Website, available at http://www.eurocontrol.int/corporate/public/standard_page/history.html

¹⁰⁹ "Mission and Vision," EUROCONTROL Website, available at http://www.eurocontrol.int/corporate/public/standard_page/org_mission.html.

¹¹⁰ Keith Campbell, "Africa Must Make Big Air Traffic Control Decisions," *Creamer Media's Engineering News Online*, 19 November 2004, available online at http://www.engineeringnews.co.za/article.php?a_id=59524.

¹¹¹ "Information on Route Charges Collection Mechanism Operated by IATA," International Civil Aviation Organization Council - 159th Session, 20 January 2000, available online at <http://www.icao.int/ICDB/HTML/English/Representative%20Bodies/Council/Working%20Papers%20by%20Session/159/C.159.WP.11257.en/C.159.WP.11257.EN.HTM>.

forwarded to nations maintaining sovereignty over the applicable airspace. Collection of fees by a centralized non-governmental agency offers several advantages. First, fees collected are used first and foremost for reinvestment in the air traffic and air transportation system, ensuring continued system maintenance and improvement. Fee management by a non-governmental organization also provides investors with confidence that funding will be prioritized for air traffic system benefit. Finally, collection and accounting of fees by an outside organization better holds less scrupulous governments accountable for appropriate use of funds collected. The IATA, under ICAO, currently collects fees on behalf of several African nations including Botswana, Burundi, and the DRC.¹¹² A single organization collecting and disbursing fees on behalf of all nations would better ensure standardization of the air traffic system Africa-wide.

As part of a long-term strategy, once the en-route facility structure is established, a portion of fees collected should be set aside for investment in major airport and terminal air traffic system improvement. The funding set aside may then be used for air traffic system improvements at major airports to include airport surveillance radars, control towers, and approach and landing navigational aid systems. The intent of the fund would be to provide an investment program for nations to improve major air terminals with the initial objective of each nation having at least one fully functional commercial airfield. Nations would then be required to repay the costs over the long-term using airport generated landing fees.

Development of a comprehensive continental air traffic system requires two significant steps. First, nations must agree to release control, not sovereignty, of their upper level airspace to an outside organization. Second, and perhaps, more significantly in Africa, nations must agree to collection and management of over-flight fees by a central organization with appropriate reimbursement. Organization and negotiation of an agreement of this magnitude requires the

¹¹² “Information on Route Charges Collection Mechanism Operated by IATA,” Para. 10.

involvement and oversight of ICAO through a continental organization like the African Union or an existing African aviation organization. Organizational assistance is imperative to the initiation and success of a continental air traffic control system. Pulling together international partners from throughout the world as well as non-governmental organizations is where USAFRICOM leadership can significantly help.

Organizational Assistance

As previously discussed, the expertise, energy, and resolve to improve Africa's air traffic system is readily available and, in fact, currently in place. Major international organizations including the ICAO and the European Union,¹¹³ national contributors including the United States,¹¹⁴ and regional organizations like the AFRO-CAA and ASECNA have improvement programs under way.¹¹⁵ However, no organization has yet integrated the various programs into a comprehensive plan to ensure they meld into a cohesive, comprehensive, and efficient overall system.

USAFRICOM, as the DoD representative, needs to partner with the Departments of Transportation and State to initiate action through ICAO for continent-wide air traffic system oversight. In March 2007, United States Air Forces Europe (USAFE) introduced a comprehensive organizational plan to consolidate US government air traffic management capabilities in Western Africa to improve air traffic safety. The Air Domain Safety and Security Program provides an interagency approach to assist African nations in improving both air safety and security.¹¹⁶ The program calls for a cooperative effort including USAFRICOM, the FAA, off shore Navy assets, and the Department of State to consolidate assistance to African air traffic

¹¹³ "IATA Announces Four Point Agenda For Africa, p 2."

¹¹⁴ "Aviation: Taking U.S. Solutions Worldwide," *Volpe Center Highlights*.

¹¹⁵ "New Agency Aims to Boost Africa's Air Safety."

¹¹⁶ Colonel Betty Ludtke, "The Case For Air Domain Safety and Security in Africa," briefing developed for presentation to multiple audiences, 3 March 2008, p. 4.

surveillance. The program provides an exceptional overview of the advantages in consolidating organizational efforts, but is currently limited to US government resources. While requiring additional planning, the USAFE program may well provide a model for use in development of a continent-wide partnering program.

As part of an overarching program, USAFE also initiated a program in 2007 to establish mutual cooperation and coordination in the Gulf of Guinea region.¹¹⁷ Although limited, their efforts aimed to, “harmonize views among relevant US government agencies on a collaborative approach to improving air safety and security in this strategically important sub-region.”¹¹⁸ Discussions included incorporation of available air traffic, air safety, and air transportation consultation and capabilities to improve air operations in the Gulf of Guinea region. Although not yet fully implemented, the project provides a representative model of the organizational approach required for comprehensive planning extending throughout the continent.

Investment for improving Africa’s air traffic system requires commitment from both African nations themselves and USAFRICOM. In 2004, up to 39 million dollars was awarded to develop an air traffic system structure for Iraq.¹¹⁹ USAFE’s Air Domain Safety and Security Program outlined 2.8 to 4.1 million dollars annually to cover program oversight including “assessments, demonstrations, symposia, and administrative and travel costs.”¹²⁰ Final funding for USAFRICOM is pending Congressional appropriation, although it appears the command will receive only 286 million dollars of the 380 million dollar budget requested. Appropriate funding for a comprehensive approach to air traffic system improvement does more than provide

¹¹⁷ Meeting Report of the Gulf of Guinea Air Security Cooperative Initiative, conducted at Ramstein Air Base, Germany, 17-18 September 2007.

¹¹⁸ *ibid*, p. 4.

¹¹⁹ Janet Kopec, “Raytheon Wins Contract to Provide Air Traffic Management Systems for Iraq,” *PRNewswire*, 21 January 2004, available online at www.prnewswire.com/cgi-bin/micro_stories.pl?ACCT=149999&TICK=RTN&STORY=/www/story/01-21-2004/.

¹²⁰ Ludtke, “The Case for Air Domain Safety and Security in Africa,” p. 14.

resources needed for program inauguration, it “backs-up” AFRICOM’s stated commitment to program success.

An ally in funding may be United States Transportation Command (USTRANSCOM), DoD’s primary user of Africa’s air traffic system.¹²¹ In addition to controlling 87 ships, 1,269 aircraft, and 2,150 railcars, the command controls over 1.4 billion dollars in supporting infrastructure.¹²² Joint Publication 4-01 designates USTRANSCOM as the focal point for the integration of DOD transportation procedures and systems. The publication also states, “a modern, flexible, and responsive transportation network capable of integrating military, commercial, and host nation resources must exist in order to project US military power anywhere in the world.”¹²³ Responsibility for assistance in development of the transportation network, including infrastructure, would fall to USTRANSCOM.

With additional detail, Joint Publication 4-01.5, *Joint Tactics, Techniques, and Procedures for Transportation Terminal Operations*, highlights a five-step process for optimizing cargo terminals including, “estimating construction requirements, which are the requirements for repair, rehabilitation, or new construction of facilities necessary to increase the terminal capacity to equal the required terminal workload.”¹²⁴ Through funding via the Transportation Working Capital Fund, USTRANSCOM could provide infrastructure to support air traffic and navigation infrastructure in the key airports routinely utilized by command tasked aircraft.

Initially establishing a team approach to African air traffic system improvement falls within USAFRICOM’s purview. The command’s mission statement in part is to “promote U.S. national security objectives by working with African states and regional organizations to help

¹²¹ “Transportation Assets,” *United States Transportation Command Website*, available online at <http://www.transcom.mil/>.

¹²² *ibid.*

¹²³ Joint Publication 4-01, *Joint Doctrine For The Defense Transportation System*, 19 March 2003, p. 1-2.

¹²⁴ Joint Publication 4-01.5, *Joint Tactics, Techniques, and Procedures for Transportation Terminal Operations*, 9 April 2002, pp. 2-2 - 2-3.

strengthen stability and security in the AOR (area of responsibility).”¹²⁵ Additionally, USAFRICOM’s identified tasks include fostering an interagency approach to partner with African nations to “enhance humanitarian assistance, disaster mitigation, and response activities.” Partnering with other US governmental agencies, national governments, and regional agencies to improve Africa’s air transportation infrastructure falls well within USAFRICOM’s stated mission and tasks.

The command’s involvement in developing an efficient, effective air transportation infrastructure also falls within the operational phasing construct of “shaping” as outlined in Joint Publication 5-0, *Joint Operations Planning*.¹²⁶ Activities associated with “shaping” are normally outlined in each command’s Security Cooperation Plan (SCP) and should be included in USAFRICOM’s SCP.¹²⁷

Although USAFRICOM can and should take the lead in facilitating an organizational plan incorporating all agencies, the plan for air traffic system improvement needs to include a transition of control to the State Department.¹²⁸ Joint Publication 1, *Doctrine for the Armed Forces of the United States* assigns the Department of State as lead organization for interagency support coordination overseas.¹²⁹ DoD organizations are tasked with a direct support role in effecting national objectives in an interagency role.

After transitioning lead agency responsibility to the Department of State, USAFRICOM should continue an active supporting role in air traffic system improvement. The command can advocate the DoD position for a comprehensive air traffic system in Africa as a user of the air transportation system in security and humanitarian support roles. In an interagency role,

¹²⁵ *ibid.*, p. 8.

¹²⁶ Joint Publications 5-0, *Joint Operations Planning*, 26 December 2006, pp. 4-33 - 4-36.

¹²⁷ *ibid.* p. 4-34.

¹²⁸ Joint Publication 1, *Doctrine for the Armed Forces of the United States*, 14 May 2007, p. 7-4.

¹²⁹ *ibid.* p. 7-4.

USAFRICOM partnership with the Department of State is integral in continuing organization and development of an interagency approach for US assistance in air traffic system development. Additionally, the command can assist the FAA in establishing the “safe skies” program, as well as providing training and consultation to nations working to establish a viable civil aviation administration.

Developing joint partnerships as well as interagency support, USAFRICOM can work with each of the military services to coordinate available training and consultation to establish and improve national air transportation oversight. DoD may have training available in areas including air traffic control, airfield operations, airspace management, and aviation safety, particularly aircraft accident investigation. Extensive information concerning airfield suitability and capability as well as instrument approach procedure development may also be shared with nations to increase system effectiveness.

Although USAFRICOM leadership is integral, any program to improve Africa’s air traffic system hinges on buy-in and commitment by African nations themselves. From program outset, USAFRICOM and its interagency partners must create a plan to inform and gain the commitment of African nations. Regional air traffic organizations would almost certainly prove instrumental as key representatives in gaining both access and the support of African nations in the effort to create a comprehensive air traffic system. A comprehensive and aggressive information and communication plan is a key in gaining the commitment required of African nations to maximize program success.

Despite expanding oil production capability, abundant natural resources, and a growing employment population, without an adequate transportation infrastructure, Africa is doomed to languish in today’s increasingly globalized economy. Nigerian President Olusegun Obasanjo stated in 2003;

There is no gainsaying the fact that Africa lacks basic infrastructure...including transport. The gap in infrastructure constitutes a serious handicap to economic growth and poverty reduction on the continent. Improved infrastructure could - and would - transform the continent into an investor's haven."¹³⁰

With the activation of USAFRICOM, interagency leadership now exists to focus the efforts of numerous international and regional agencies in developing a comprehensive continent-wide air traffic system. A single air traffic system offers improved international air traffic safety and efficiency while providing funding and management for future system growth and maintenance. More than funding, making a continent-wide air traffic system a success requires both partnership and commitment by African nations, regional organizations, users of the air traffic system, and international partners.

Too often in the past, the United States has looked at African stability and security in terms of troops on the ground or funding aid required, and determining the benefit not equal to the cost, elected to pay it little regard. However, beyond immediate physical security, the Department of Defense possesses something more valuable to Africa. It possesses the expertise and experience to assist in organizing efforts to maximize and consolidate existing resources to help Africa improve its own security and stability. Through assistance in organizing a comprehensive plan to improve Africa's air traffic system, USAFRICOM can and should play a significant role in improving the continent's economic growth and stability.

¹³⁰ Essenbert, p. 10.

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